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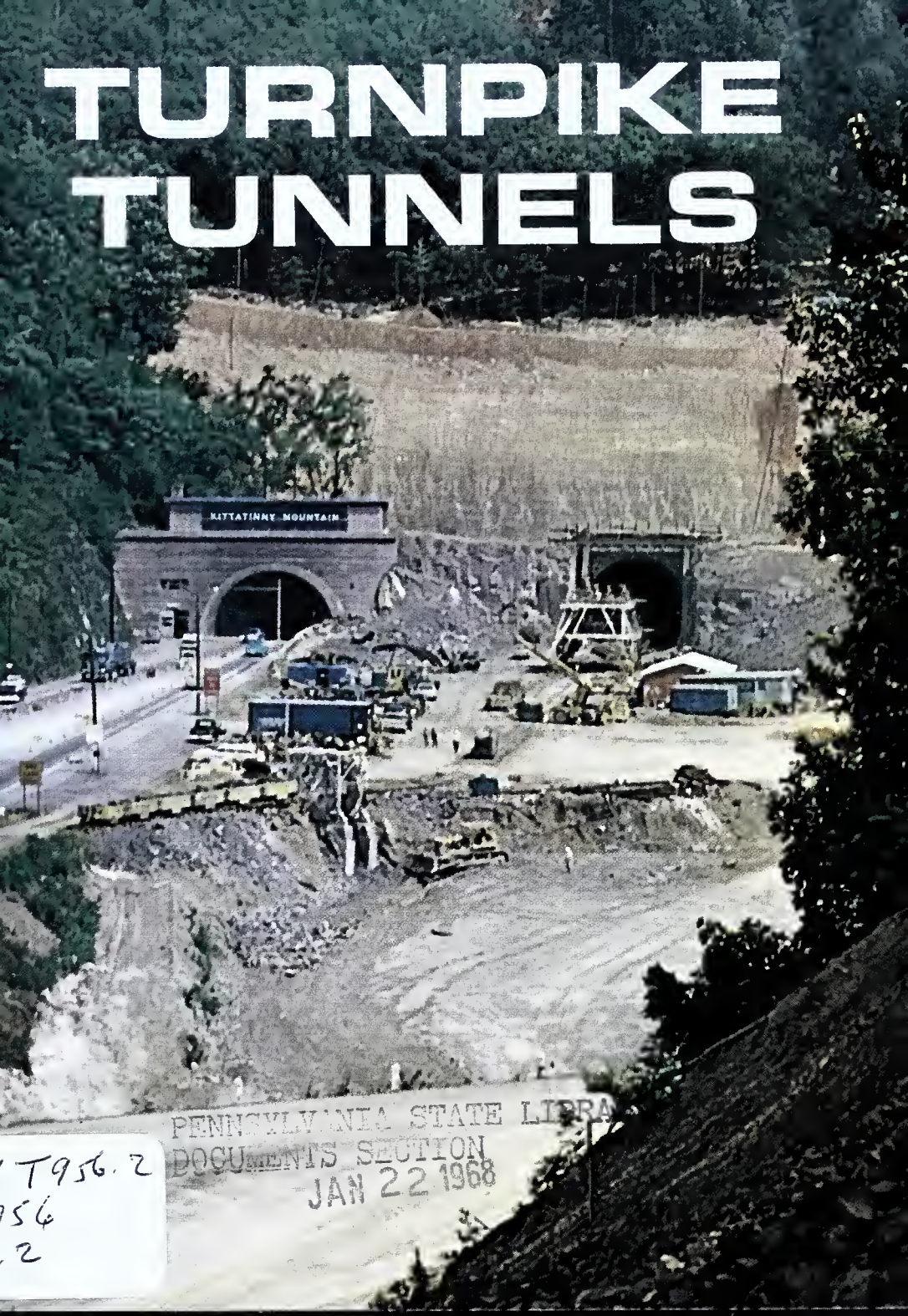
TURNPIKE TUNNELS



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A 100 Million Dollar Story

Foreword...

The original Pennsylvania Turnpike, a four-lane scenic-toll highway through the heart of the Allegheny Mountains, was opened to traffic on October 1, 1940. This first, of the modern turnpikes was only 160 miles in length from Irwin, Westmoreland County, to Carlisle, Cumberland County, and two weeks after it opened more than 26,000 vehicles were using the road daily.

Today, the Pennsylvania Turnpike System consists of 470 miles of four-lane highway extending from the Ohio State Line in the west to the Delaware River Bridge in the east, and an additional northeast extension carries the turnpike traffic north to the city of Scranton.

The Turnpike was the first long-distance highway in America to be planned and constructed as a freeway or superhighway. At the time the first 160-mile stretch was opened, the New York Times commented that it was a road "such as has been seen hitherto only in miniature at the Futurama at the World's Fair . . . superspeed, supersafe route, the longest of homogeneous design in the country . . ."

In comparison to the original 26,000 vehicles using the turnpike in 1940, today more than 100,000 passenger cars, buses and trucks move across the highway each day, with each succeeding year marking an increase in turnpike traffic.

RAYMOND P. SHAFER
Governor

COMMISSIONERS

Lester F. Burlein, Chairman
William A. Meehan, Vice Chairman
Patrick E. Kerwin, Secretary-Treasurer
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Robert G. Bartlett, Ex Officio

The Beginning...

Seven two-lane tunnels were constructed as a part of the original section of this "Granddaddy" of the modern highway system. With the exception of the Allegheny Mountain Tunnel, these tunnels are in the same location as the tunnels that were built more than 80 years ago as a part of the South Penn Railroad across Pennsylvania.

By 1958, it was evident that the tunnels on the original 160 miles of turnpike could not hold the ever-increasing traffic and plans were made to construct either double tunnels or bypasses at all points.

Engineering firms were retained to study the problems at each of the seven tunnels. These studies included two basic methods to solve the problems. The first method provided for the construction of a four-lane bypass and the second method provided for the construction of a new

parallel tunnel and the rehabilitation of the existing tunnel. After considering the merits of the respective methods, the Commission decided to proceed with the construction of a new parallel tunnel and the necessary reconstruction of the existing tunnels at Blue Mt., Kittatinny Mt., Tuscarora Mt., and Allegheny Mt., and to construct a bypass of the existing tunnels at Ray's Hill, Sideling Hill and Laurel Hill.

Work on a double tunnel through Allegheny Mountain and a new 3.1-mile bypass around Laurel Hill Tunnel got under way with ground-breaking ceremonies on September 6, 1962.

The Laurel Hill Bypass, a masterpiece of modern engineering was opened to the public in the Fall of 1964. A feature of the bypass is a 145 ft. cut through solid rock.

Tunnel construction contracts are presently under way at the Blue Mt., Kittatinny Mt., and Tuscarora Mt. Sites and a bypass is presently under construction around the Ray's and Sideling Hill Tunnel sites.

ORIGINAL TUNNELS		COMPLETED PROGRAMS
LAUREL HILL	4,541 feet	3.3 MILE BYPASS
ALLEGHENY	6,070 feet	NEW PARALLEL TUNNEL
		PLANNED PROGRAMS
SIDELING HILL	6,782 feet	NEW 13.1 MILE BYPASS
RAY'S HILL	3,532 feet	
TUSCARORA	5,326 feet	NEW PARALLEL TUNNEL
KITTATINNY	4,727 feet	NEW PARALLEL TUNNEL
BLUE	4,339 feet	NEW PARALLEL TUNNEL

Blue and Kittatinny Mountain Tunnels:

C. J. Langenfelder and Son, Inc., of Baltimore, Maryland, is the contractor for the 4,727 ft. long Kittatinny Mountain Tunnel No. 2 and the adjacent 4,339 ft. long Blue Mountain Tunnel No. 2. These projects are being built at a cost of $16.4 million.

The work area between Blue and Kittatinny Mountains is in the Shippensburg Water Authority's prime water shed and is less than one-half mile above the upper end of the Boro's main reservoir. The contract documents, therefore, prohibit any tunnel operations in this area. As a result, the tunneling is being carried out from one end only at each of these two tunnels. The waste

and drainage is taken out through the tunnels and dumped on the far mountain side of the water shed area in order to avoid contamination of the water supply.

As a further precaution, Trout Run, the stream which feeds this reservoir, was encased in a metal pipe in order to further insure its protection against construction pollution.

The full-faced method in which the entire tunnel cross-section is removed at one time is being utilized in both the Blue and Kittatinny Mountain Tunnels. Three-deck, rail-mounted jumbos are used for drilling holes, placing the explosives and for setting the temporary structural steel. Tunnel muck is being removed from the Kittatinny Tunnel project on rail-mounted locomotive-drawn cars. Tunnel muck from the Blue Mountain Tunnel is being removed by rubber-tired dumpsters.

The tabulation below will indicate some of the major items of construction:

DESCRIPTION	QUANTITY	
	Blue Mt. Tunnel	Kittatinny Mt. Tunnel
Roadway Excavation	340,000 cu. yd.	520,000 cu. yd.
Tunnel Excavation	180,000 cu. yd.	200,000 cu. yd.
Tunnel Reinforcing Steel	1,850,000 lbs.	1,650,000 lbs.
Structural Steel Supports	5,500,000 lbs.	5,200,000 lbs.
Tunnel Concrete	34,000 cu. yd.	46,000 cu. yd.

Additional contracts for construction of portal buildings, plumbing, heating and ventilation, electrical power distribution and lighting, and the supply and installation of fans, motors and drives for the ventilating system will be let at a later date. The cost for these additional projects is approximately $5.5 million.

Design and inspection work for these projects is being performed by Michael Baker, Jr., Inc., of Rochester, Pennsylvania, and Bellante and Clauss Inc., of Scranton, Pennsylvania, as a joint venture.

Tuscarora Mountain Tunnel:

Peter Kiewit Son's Company of Omaha, Nebraska, is the contractor for the $9.8 million, 5,326 ft. long Tuscarora Tunnel No. 2, which is being mined from both sides using two-deck jumbos for drilling, loading, and setting temporary tunnel steel. Side-dump loaders are used in the mucking operation, and the tunnel muck is being hauled from the tunnel with rubber-tired, rear-dump trucks. Excavation of Tuscarora Mountain Tunnel is being carried out by the top-header method. In this method, the upper portion of the tunnel is completely mined through as the first operation. When this is completed, the contractor then goes through and removes the lower bench.

The tabulation below will indicate some of the major items of construction:

DESCRIPTION	QUANTITY
Roadway Excavation	613,000 cu. yd.
Tunnel Excavation	225,000 cu. yd.
Tunnel Reinforcing Steel	1,860,000 lbs.
Structural Steel Supports	6,000,000 lbs.
Tunnel Concrete	50,000 cu. yd.

Additional contracts for construction of portal buildings, plumbing, heating and ventilation, electrical power distribution and lighting, and the supply and installation of fans, motors, and drives for the ventilating system will be let at a later date. The cost for these additional projects is approximately $2,950,000.

Design and inspection work for these projects is being performed by Michael Baker, Jr., Inc. of Rochester, Pennsylvania.

Ray's Hill-Sideling Hill Bypass:

A bypass is presently being constructed around the Ray's Hill-Sideling Hill Tunnels. This bypass is 13.66 miles in length and includes a reconstruction and relocation of the Breezewood Interchange Toll Plaza. The new highway replaces 13 miles of existing roadway and does not add to the length of the turnpike.

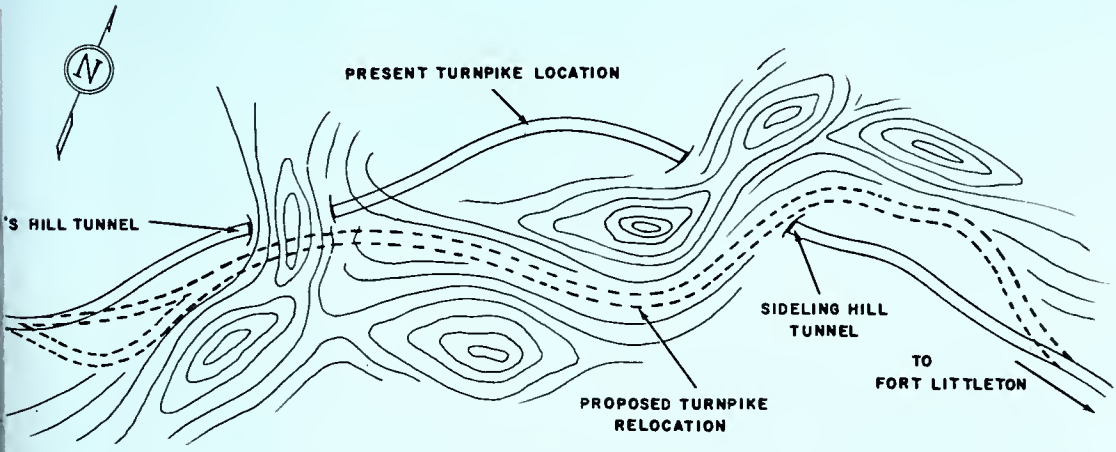
The bypass will be constructed in three sections. The first section is 6.42 miles in length and is being constructed by the New Enterprise Stone and Lime Company, Inc., of New Enterprise, Pennsylvania, at a cost of $7,305,000. The second section which is 4.37 miles in length is being constructed by the Nello L. Teer Company at a cost of $6,200,000. The third section is 2.87 miles in length. Bids on this project will be received at a later date. The estimated cost for the total bypass is $18,386,000.

The bypass consists of two 12 ft. lanes of ten-inch reinforced concrete pavement on an eight-inch sub-base on each side of a 36 ft. wide median. An additional 12 ft. wide climbing lane will be constructed for slow-moving trucks on all up grades.

The tabulation below will indicate some of the major items of construction:

DESCRIPTION	QUANTITY
Class 1 Excavation	6,803,000 cu. yd.
Class 2 Excavation	169,000 cu. yd.
Sub-base	750,000 sq. yd.
Stabilized Shoulders	297,000 l.f.
Reinforced cement concrete pavement	490,900 sq. yd.
Fabricated Structural Steel	3,960,000 lbs.
Reinforcement bars	1,953,000 lbs.

The design work for these projects was performed by Bellante and Clauss Inc., of Scranton, Pennsylvania, and Buchart-Horn of York.



Laurel Hill Bypass:

Work on the original Laurel Hill Tunnel was started on January 18, 1884, as part of the South Penn Railroad that William K. Vanderbilt and Andrew Carnegie planned to build across the southern counties of Pennsylvania. The tunnel was one of nine that was partly completed along the right-of-way for a railroad that never opened.

The South Penn Railroad was designed as a double-track rail system to connect Harrisburg in the East with Port Perry, near Pittsburgh, in the West, as part of a route that was to furnish fast transportation from New York to Chicago. The contract for the building of the railroad was signed on September 6, 1883 and a few months later thousands of laborers poured into the valleys and mountains along the 200 mile route. By September, 1885 the railroad was 60 per cent completed.

Then just as suddenly as the project had started, it came to an abrupt end. Nine tunnels and many miles of graded roadway were left in various stages of completion. In the case of Laurel Hill Tunnel, the workers had bored through only 813 feet of solid rock and had used the material taken out of the tunnel to build approach grades.

For the next fifty years, the Laurel Hill Tunnel remained as just a hole in the ground, partly filled with water and its dark recesses made an ideal spot in which snakes and rats could hide.

In 1935, talk started concerning the possibility of building a turnpike across Pennsylvania, and on May 21, 1937, an Act setting up a Turnpike Commission was signed by Governor George H. Earle. Contracts were soon signed to make the turnpike a reality and plans were completed to use six of the nine abandoned tunnels as part of the Turnpike System.

The firm of Hunkin-Conkey, Inc., of Cleveland, Ohio, was given a contract for $1,578,493.38 to complete the Laurel Hill Tunnel plus $341,788.10 for approaches or a grand total of $1,920,281.48 and construction work started on April 27, 1939. The Cleveland firm extended the tunnel an additional 3,555.13 feet, and built the portal buildings at each end of the tunnel which measured 4,541 feet from portal to portal. Traffic started moving through Laurel Hill Tunnel on October 1, 1940, the date the turnpike officially opened.

Eastbound traffic began backing up at Laurel Hill Tunnel during summer week-ends of 1951. The problem grew until by 1958 a tie-up of traffic at this location was the usual thing between June and November.

By 1960, traffic had increased so greatly on the turnpike that 31,698,876 vehicles were cleared through the toll booths and it was evident that the narrow tunnels could not handle the ever-increasing load.

On August 7, 1962, the Turnpike Commission signed a contract for $7,554,092.76 with the Latrobe Construction Company

of Latrobe, for the construction of a new four-lane bypass through Laurel Hill that would enable the Commission to abandon the old two-lane tunnel. Ground-breaking ceremonies were held on September 6, 1962, and work was rushed toward completion of the project.

The actual cut, that carries the turnpike through Laurel Hill, is 145 feet in depth, one of the deepest cuts on any highway in the Eastern sector of the United States. The construction crews removed 5.5 million cubic yards of material with the total rock excavation running close to 4.25 million cubic yards.

"Blasting out a mile of rock, 145 feet deep at its thickest point, was a major problem for our construction crews," said Bruno Ferrari, President of the Latrobe Construction Company.

"We actually sliced through the main ridge of the mountain, and at the peak of our operation we were excavating 25,000 cubic yards of rock a day," Ferrari added.

The new three-mile stretch of roadway, with creeper lanes on both eastern and western slopes, was opened to traffic on Friday, October 30, 1964. With the opening of the new bypass the Laurel Hill Tunnel was abandoned.

Allegheny Tunnel:

The tunnel that carried the turnpike through Allegheny Mountain, along the original 160 miles of toll road, was the only one built from start to finish by the construction crews that went into action in 1939.

When the South Penn Railroad was started, back in 1885, there was a tunnel started through Allegheny Mountain, but like the other railroad tunnels this one was never completed. Today you can still see the gaping hole where the tunnel was cut into the mountain, but in summer the vegetation is so dense that it takes a keen eye to detect the opening.

Like the other railroad tunnels, the one at Allegheny soon became the victim of water seepage, and inside the tunnel, water still covers the floor for a long distance from the entrance. But to make matters worse, the ceiling began to crumble and rock slides soon filled parts of the tunnel.

When bids were asked for a new tunnel in 1939, the specifications were written in such a way that the contractors could have a choice of completing the old railroad tunnel, or of boring a new tunnel at another site. After surveying the inside of the old tunnel the firm of Gutherie, Marsch and Peterson of Wrightwood Avenue, Chicago, Illinois, submitted a low bid of $2,672,188.40 to build a brand new tunnel 85 feet south of and approximately parallel to the old tunnel.

The Illinois firm began work on June 19, 1939, and most of

the summer was devoted to building approach lanes to the actual tunnel site. The length of the west approach was 2,861 feet, and the east approach was 905 feet in length. By fall the construction crews were ready to go underground and the work continued through a cold and rugged winter.

The contractor excavated 660 linear feet of tunnel in November, 570 linear feet in December, 1,100 linear feet during January, 1,300 linear feet during February, and during the month of March an additional 1,485 linear feet was removed to complete the tunnel excavation on April 2, 1940.

When the turnpike was ready for traffic in October of 1940, the Allegheny Tunnel had already been turned over by the contractor and vehicles began moving through the two-lane tunnel on October 1.

Ever increasing traffic on the turnpike soon made it apparent that these two-lane tunnels were not adequate to handle the peak loads, and at Allegheny Tunnel the conditions were very similar to those that existed at Laurel Hill Tunnel. The need for a second tunnel at Allegheny was borne out by a traffic survey conducted at the site, and plans were made for construction of a second tunnel 125 feet south of the existing tunnel.

The low bidder for the actual construction of the new tunnel was submitted by Merritt-Chapman and Scott, of New York City, with a bid of $8,237,272.40. This was the same firm that built the Fort Pitt Tunnel in Pittsburgh, and the Baltimore Harbor Tunnel. Under the terms of the contract with the New York firm, the tunnel and approaches were to be completed on June 30, 1964, with the ventilation buildings and tunnel lighting to be finished one month later.

The contract called for construction of a free-air, two-lane vehicular tunnel, with a 26-foot wide roadway and 16-foot, six inch overhead clearance. Construction also included tunnel excavation, concrete lining, roadway paving, drainage structures, embedded electrical conduits, and tile wall finish.

Due to a late start, the portal area was not excavated to the point where tunneling could begin until mid-December, and then one of the most severe winters in recent years served to further reduce progress. As a result, the completion of the tunnel was delayed for almost nine months and did not actually open for traffic until Monday, March 15, 1965.

The new tunnel contains many modern features that were not even thought of when the original tunnel was built in 1940. White tile walls, that are easier to clean than the old concrete walls,

were an outstanding feature. Fluorescent lights are on both ceilings, a total of more than TWO MILES of continuous lighting, and powerful ventilating fans keep the air clean night and day. These fans were originally incorporated into the original tunnels when they were opened in 1940.

Following completion of the new tunnel, the Commission awarded a contract for $3,460,934.50 to Latrobe Road Construction, Inc., of Latrobe, Pa., for renovation of the old tunnel. Every effort was made to complete the work before Labor Day 1966, and the construction firm turned the tunnel over to the Commission for an official opening on August 26, 1966.

The dark, dingy walls of the old tunnel were covered with sparkling white tile and the Nager Electric Company of Mid-Atlantic, completed installation of nearly two miles of Fluorescent lighting at a cost of $319,000.

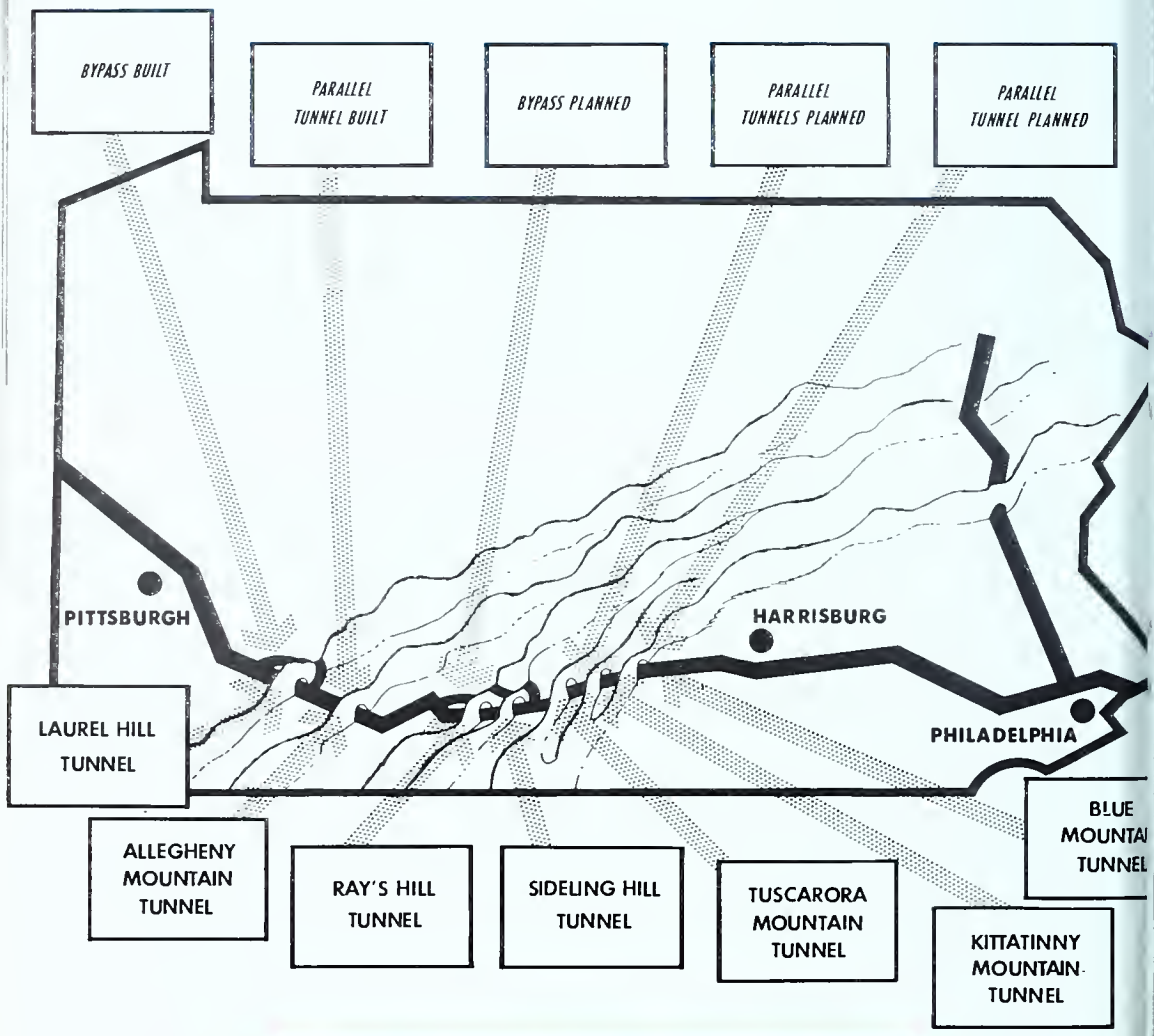
Modern ventilation was provided for the tunnel by Bayley Blower Company of Milwaukee, Wisconsin, at a cost of $97,950, and the two tunnels, one for two lane traffic eastbound, and the other for two lane traffic westbound, are virtually identical in appearance.

Both tunnels were designed by the engineering firm of Michael Baker, Jr., of Rochester, Beaver County, and every effort was made to provide turnpike patrons with the latest innovations in tunnel construction.

With the completion of the Allegheny Mountain Tunnels, and the new three-mile stretch of four-lane highway through the heart of Laurel Hill Tunnel, the turnpike was able to provide four-lane roadway from the Ohio Border to Ray's Hill Tunnel, a distance of 165 miles.

As soon as the Commission was able to finance the projects, work was started to build new tunnels through Tuscarora, Kittatinny, and Blue Mountains and to construct a new 13-mile bypass that was designed to eliminate both Ray's Hill and Sideling Hill Tunnels. This new construction was estimated to cost more than $77,000,000, and with $23,000,000 already spent at Laurel Hill and Allegheny Mountain, the turnpike's modernization program will cost better than $100,000,000, when everything is completed.

$100,000,000 CONSTRUCTION PROGRAM TO MAKE THE PENNSYLVANIA TURNPIKE SMOOTHER AND SAFER



For **"What to See on the Pennsylvania Turnpike"**
Write to P.O. Box 2531 Harrisburg, Pa.